

A HANDBOOK OF TECHNIQUES AND TOOLS



U.S. DEPARTMENT OF ENERGY

DEFENSE PROGRAMS
SPECIAL PROJECTS GROUP (DP-31)

ENVIRONMENT, SAFETY AND HEALTH
OFFICE OF OPERATING EXPERIENCE,
ANALYSIS AND FEEDBACK (EH-33)



Performance-Based-Management



http://www.linl.gov/PBM/handbook

How to Measure Performance A Handbook of Techniques and Tools

Prepared by the
Training Resources and Data Exchange (TRADE)
Performance-Based Management Special Interest Group

for the Special Project Group Assistant Secretary for Defense Programs

and the
Office of Operating Experience, Analysis and Feedback
Assistant Secretary for Environment, Safety and Health
U.S. Department of Energy

October 1995

The Training Resources and Data Exchange (TRADE) network is managed by the Oak Ridge Institute for Science and Education. The Oak Ridge Institute for Science and Education (ORISE) was established by the U.S. Department of Energy to undertake national and international programs in science and engineering education, training and management systems, energy and environment systems, and medical sciences. ORISE and its programs are operated by Oak Ridge Associated Universities (ORAU) through a management and operating contract with the U.S. Department of Energy. Established in 1946, ORAU is a consortium of 88 colleges and universities.

The Training and Management Systems Division designs, delivers, and manages training programs for the U.S. Department of Energy, other federal and state agencies, industries and industrial trade groups, and the private sector; manages widespread dissemination of training systems and information; conducts needs analyses; and finds solutions for training and human resource management problems.

This material resulted from work developed under government contract no. DE-AC05-76OR00033 and is subject to the following license: A paid-up nonexclusive, irrevocable, worldwide license in such work to reproduce, prepare derivative works therefrom, distribute copies to the public five years after October 1995, and perform or publicly display by or for the government such works. Neither the United States Government nor the U.S. Department of Energy, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe on privately owned rights.

©October 1995
Oak Ridge Associated Universities

TABLE OF CONTENTS

Preface	iii
Overview	V
Section 1: Development Processes	
Overview	. 1-1
1.1 Performance Measurement Process	. 1-3
1.2 Developing Performance Measures–A Systematic Approach	1-35
1.3 Developing Performance Metrics-University of California Approach	-53
1.4 Performance Indexes	l -5 9
Section 2: Data Tools	
2.0 Overview	. 2-1
2.1 Data Collection Techniques	2-7
2.2 Charts, Graphs, and Diagrams	2-13
2.3 Presentation Approaches	2-31
Appendix A: Glossary of Terms	A-1
Appendix B: Performance Measurement Process Case Study	B-1
Appendix C: Sample Performance Measures	C-1
Appendix D: Related References	D-1



PREFACE

Introduction

The Training Resources and Data Exchange (TRADE) Performance-Based Management Special Interest Group (PBM SIG) was chartered to foster continuous improvement and facilitate the use of performance-based management techniques within the U.S. Department of Energy (DOE) community. This handbook has been compiled by the PBM SIG to provide reference material to assist in the development, utilization, evaluation, and interpretation of performance measurement techniques and tools to support the efficient and effective management of operations.

Contributors

The following members of the TRADE PBM SIG served as the project team for the compilation of this handbook:

- Joel Anderson, Los Alamos National Laboratory
- Will Artley, Oak Ridge Institute for Science and Education
- Amanda Denton, Lockheed Martin Energy Systems, Inc.
- Cynthia Eubanks, Lockheed Martin Energy Systems, Inc.
- Jean George, Lawrence Livermore National Laboratory
- Tammra Horning, Lockheed Martin Energy Systems, Inc.
- Bob Lyon, Lockheed Idaho Technologies Company
- Jeff Murphy, Lawrence Livermore National Laboratory
- Barbara Strack, Westinghouse Savannah River Corporation
- Kim Wilson, West Valley Nuclear Services

Other subject matter experts in performance-based management programs who provided information or participated in the preparation or review of this handbook include Anne Roe, Westinghouse Savannah River Corporation; Stan Love, retired, Sandia National Laboratories-Albuquerque; Buck Koonce, University of California; Mary Ayles, Jack Ewing, and R. S. (Bud) Leete, Lockheed Martin Energy Systems, Inc.; Megan Lohmann, DOE Nevada; TRADE PBM SIG Advisors Paul Krumpe and Richard Day, DOE Headquarters.



OVERVIEW

"How to measure performance?" How often do you ask yourself this question? Once a week? Once a month? Never? If you're a successful manager in a successful organization, you probably ask yourself this question every single day. However, measuring performance often isn't easy.

In the performance measurement arena, you don't always (or even often) get the results that you expect, want, or predict. After expending a great deal of energy collecting information, just when the results look promising, you find that you're measuring the wrong things.

It doesn't have to be this way. Two key words, although they won't completely solve your performance measurement problems, can put you on the path to success: disciplined approach. All too often performance measurement programs, created with the best intentions, fail because they were short sighted, ill conceived, and unfocused. Most of these ailments can be traced to one source: the lack of a viable approach to performance measurement from the start.

This handbook offers three such disciplined, systematic approaches.

- The first approach, the Performance Measurement Process, was developed by the DOE Nevada Family Quality Forum. This approach is quite detailed and outlines an 11-step process for measuring performance.
- The second approach, Developing Performance Indicators . . . A Systematic Approach, was used at Sandia National Laboratories. It is less detail-oriented than the first, and uses a fictitious company, the Hackenstack Firewood Company, for anecdotal purposes.
- The third approach, Developing Performance Metrics-the University of California Approach, was developed by the University of California. This method is broadest in scope.

Different organizations have different needs. Providing multiple approaches allows an organization to pick and choose which approach, or combination of approaches, is right for it.

It is important to remember that the approaches previously outlined were developed independently; they may use different terminology. For instance, what the first approach refers to as a performance measure may be referred to as a performance indicator in the second approach, or a performance metric in the third. All three approaches are referring to the same concept; however, each uses a different nomenclature (in fact, each approach has its own glossary). Fortunately, this causes problems only when comparing one approach to another, so be careful when you reach this stage.

A sound approach to performance measurement is a necessary ingredient for ensured success, but it alone is not sufficient. You will also need to know what to do with performance measurement data once it has been collected. The last few sections of this handbook provide some helpful hints on proven methods of data analysis and management.